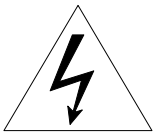
HP4000EX

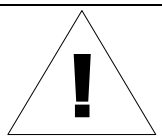
Hardware Manual

INFORMATION TO USER

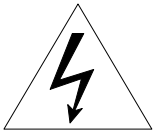


CAUTION

RISK OF ELECTRIC SHOCK,
DO NOT OPEN



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK).
NO USER SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SEERIVCE PERSONEL.



This symbol is intended to alert the user to the presence of un-insulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

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OVERVIEW

The most outstanding characteristic of the HP4000EX is the capability of H.264 compression of D1@NTSC 16 channel video at 480 frames per second.

- Video Compression : 720x480 (NTSC) / 720x576 (PAL) at 480/400 frames/sec
- Compression method : H.264 Baseline Profile and MJPEG
- Uncompressed video capture : up to 480/400 (NTSC/PAL) frames/sec at 16 channels
- 16 channels of real-time display (supporting various dividing modes)
- Compressed audio capture : mono 16 channels, G.711 mulaw compression
- Uncompressed audio capture : mono 16 channels
- Video Resolution: Max. 720x576 (PAL) / 720x480 (NTSC)
- Sensor/Alarm (Max. 16 channel sensor, 16 channel alarm)
- External monitor display (supporting various dividing modes)
- Watchdog function supported
- Multi-card supported
- Motion detection supported
- Burnt-in Text supported
- Privacy Region supported
- Integrated Software Development Kit (SDK) provided

PACKAGE CONTENTS

Unpack carefully and handle the equipment with care. The packaging contains:

- **HP4000EX**
- **DVI & 16RCA Cable**
- **DVI & 16BNC/1RCA Cable**

The above contents are subject to change without prior notice.

PRODUCT DESCRIPTION

Equipment Specifications

HP4000EX supports two view modes: Multi View mode and Switching View mode. HP4000EX works only one mode of the two view modes regarding the choice of firmware. In the Switching View mode, HP4000EX supports 16 channels video input and 1 switching view output, whereas in the Multi View mode, HP4000EX supports 15 channels video input and 1 multi view output.

Summary

Video	View Mode	Switching View	Multi View
	Input Channel	16 ch	15 ch
	Display Frame Rate (PAL/NTSC)	400/480	375/450
	Raw Data Capture	Support (YUY2, I420)	
	Compression	Support (H.264 Baseline and MJPEG)	
	Compression Frame Rate (PAL/NTSC)	400/480 fps@CIF	375/450 fps@CIF
	Max. Resolution(PAL/NTSC)	720x576 / 720x480	
Audio	Input Channel	16 ch	15 ch
	Raw Audio Capture	Support (PCM)	
	Bit Per Sample	16 bit	
	Sampling Frequency	8, 16KHz	
	Compression	Support (compression mulaw)	
	Compression Sampling Frequency	8 KHz	
OSD		Support (Overlay, Composite, Compressed data)	
Burnt-in Text		Support	
Privacy Region		Support	
Motion Detection		Support	
External Video Out		1 ch (Switching)	1 ch (Multi-view SD*[1], Multi-view HD*[2])
Sensor / Alarm		Support with extension Card	
RS-485/422		Support with extension Card	
Multi-card		2 cards	

*1 Multi-view SD makes limitation of 15 ch encoding.

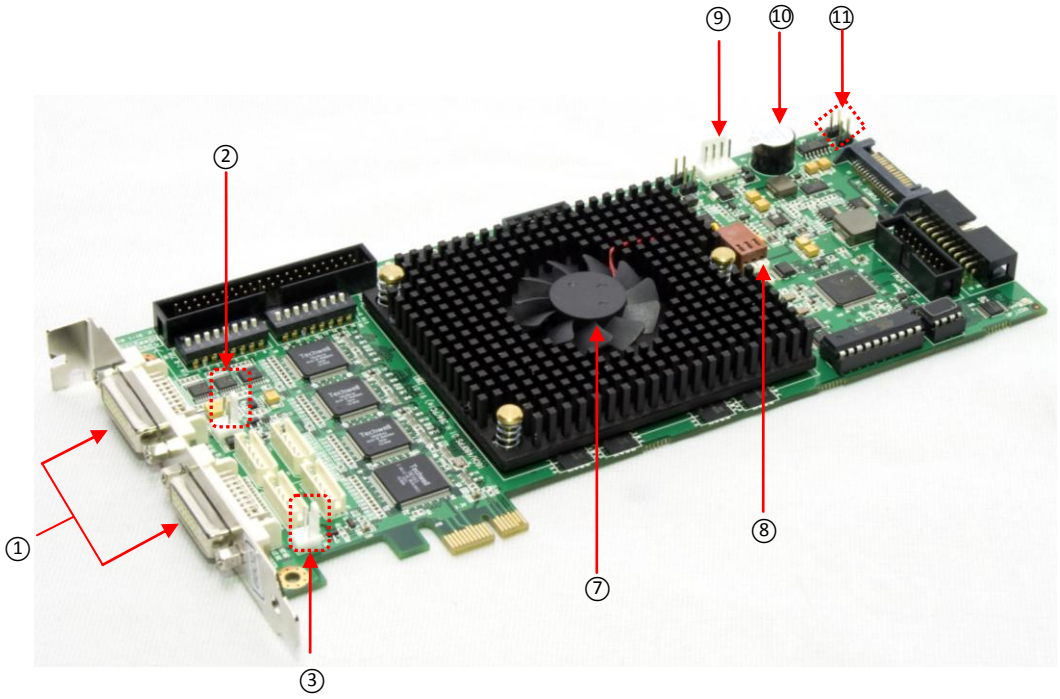
*2 Multi-view HD will be supported in the future and it makes limitation of 14 ch encoding.

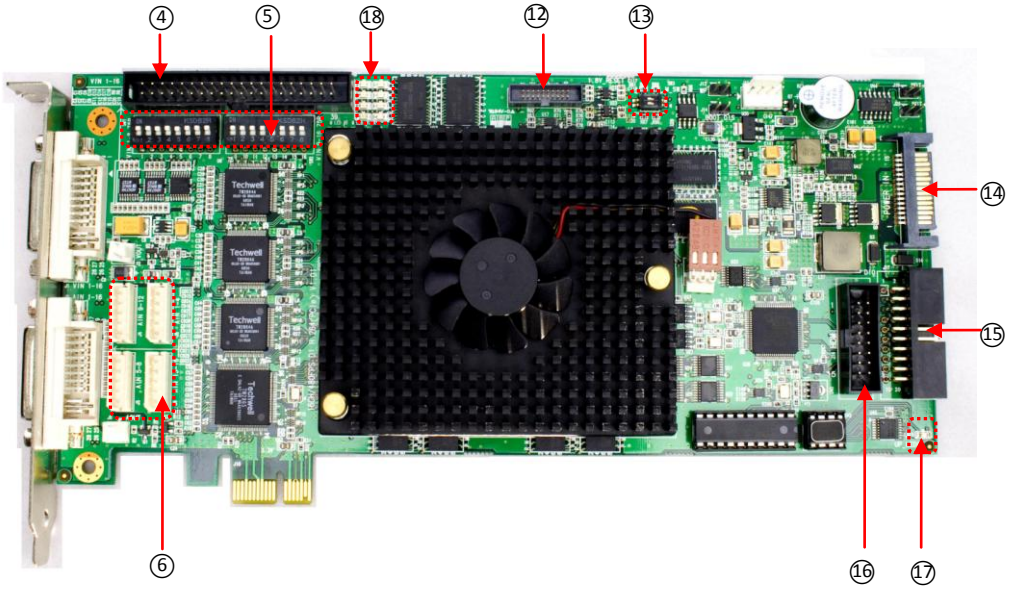
System Requirements

HW Requirement	
CPU	Intel Core2Duo or higher.
RAM	1GB or higher (for single HP4000EX card)
SW Requirement	
DirectX	DirectX 7.0 or later (8.0 or later recommended)
Tools	Microsoft Visual C++ 6.0 or later

Functions of Major Connectors

Major Connectors



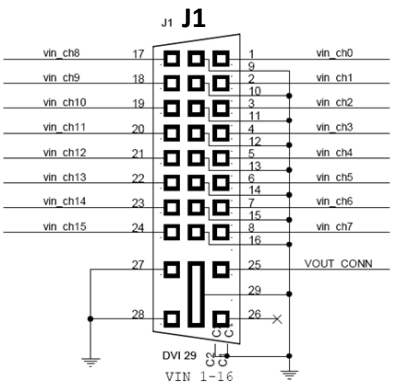


* Models herein and their appearance are subject to change without any prior notice.

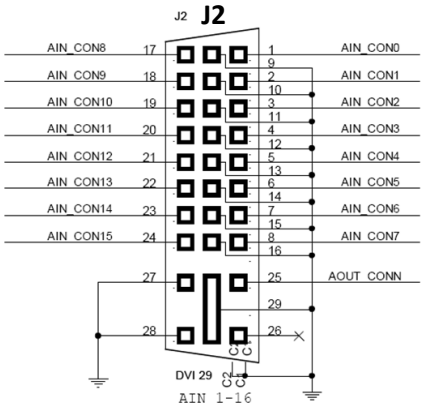
Details of Major Connectors

① DVI Connector for Video Input/output and Audio Input (J1 and J2)

There are 2 DVI connectors for video inputs/output and audio inputs. Upper one (J1) is for Video Input Channel 0 ~ 15 (VIN 1st-16th) and Video Output Channel 0 (VOUT_OUT 1st). And lower one (J2) is for audio Input channel 0 ~ 15 (AIN 1st-16th).



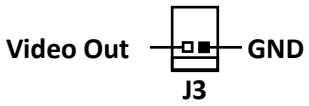
Video Input 1-16



Audio Input 1-16

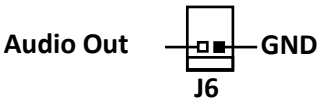
② Video Output Molex 2pin Terminal (J3) for the External Monitor

The Molex 2pin terminal for the external monitor has the same circuit function as the RCA connector of DVI to 16BNC/1RCA Cable. It shall be connected to a video input back panel offered separately.



③ Audio Output Molex 2pin Terminal (J6) for the External Output

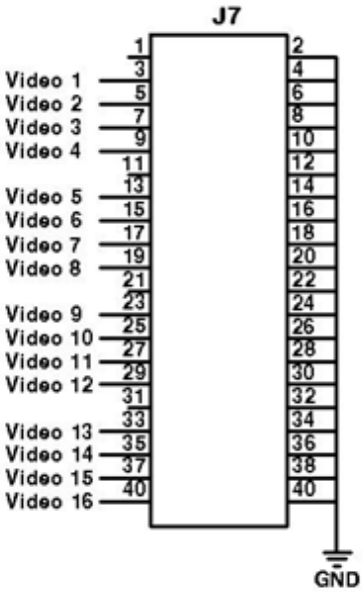
Not used. (This will be supported in the future.)



④ Video Input 40pin Box Connector (J7)

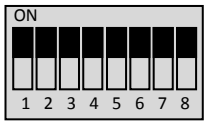
This is a 40pin box connector for video signal. Functionally, it works the same way as the DVI Connector (J1), but it is operated differently.

When using as the video input: The camera shall be connected to the back panel of the video input. The video input back panel and capture card shall be connected by 40pin flat cable. The analog signal of the camera will be put into the capture through the video input back panel and the 40pin flat cable. Be sure to connect the cable correctly using a connector with a protrusion.

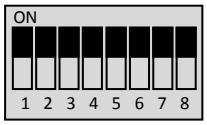


⑤ DIP Switch for Enable/Disable a 75 Ω Termination Resistor (SW1 and SW2)

These switches turn on and off the 75Ω resistor at the terminal of the video input. At the time of delivery from the factory, all of the switches in SW1 are set to ON position. Normally, it is recommended that equipment be used in the on state as was set up in the factory. The switches are turned off in some particular cases, as described below.



SW1 VIN 1-8



SW2 VIN 9-16

※ Cases when the video terminal-resistor switches are to be turned off

Several types of equipments generate, send or receive video signals and therefore require video terminal-resistor of 75Ω, such as the camera and the TV monitor and the capture card. The video terminal-resistor 16 pin DIP switch will serve this function in these cases.

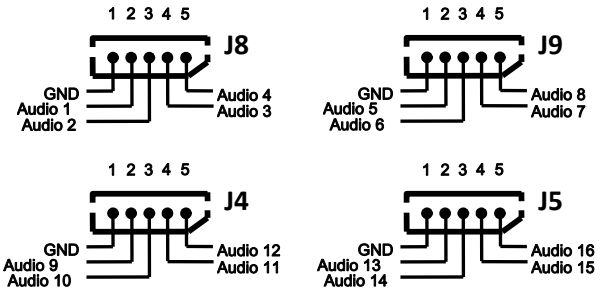
In most instances, one video output device is connected with one video input. However, sometimes, even a capture card is also to be connected to a camera in addition to the AV monitor. In case a video distributor is used, there will be no need to be concerned about the video terminal-resistor, but occasionally it is impossible to use the video distributor. In this case, set the video terminal- resistor switch of the capture card to off.

In the above instance, if the video terminal-resistor switch remains on while it should be off, the magnitude of the video signal will be very weak more than normal and the captured video images will appear very dark. Normally, if the video terminal-resistor switch is turned off when it should be on, the magnitude of the video signal will be very strong more than normal and the captured video images will appear very bright. If the captured image looks either too dark or too bright, firstly check whether the video terminal-resistor switch has been set correctly.

Switch	Description
ON	When directly connecting a camera
	When using an external device without the 75 Ω Termination Resistor
OFF	When using an external device with the 75 Ω Termination Resistor

⑥ Audio Input 5pin Molex Connectors (J4, J5, J8, and J9)

Four audio channels are connected to one set of 5pin Molex connectors. The HP4000EX is equipped with a connector so that it can be connected with 16 audio channels.

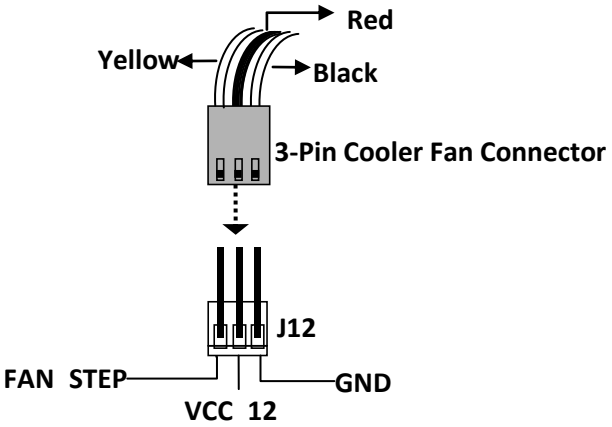


⑦ Cooler Fan for Video Processor

This is used for cooling Video Processors and located on the Video Processors.

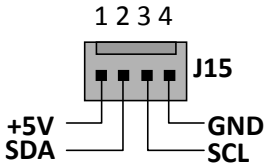
⑧ Molex 3pin Terminal for supplying Power (J12)

This is used for supplying power to the Cooler Fan and is connected to the 3-Pin Cooler Fan Connector.



⑨ 4 pin Connector for I2C (J15)

This connector is used to connect with the I2C extension card (example: EIO card), The 4 pin cable is used for the connection. The EIO card is not supplied as a basic accessory. Details will be explained in the extension card hardware manual separately supplied.

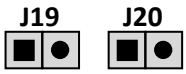


⑩ Watchdog Buzzer (BZ1)

If a system halts unexpectedly, the buzzer will sound for notifying users of the system malfunctions and then the system will reboot.

⑪ Watchdog pin header (J19 and J20)

This is a 2pin header for connecting the cables. To connect the watchdog cable, 2 sets of 2pin cable are required. One is supplied with the capture card and the other is replaced by the existing reset cable enclosed in the case of the SYSTEM. Firstly, the cable in the reset terminal of the SYSTEM case shall be connected to the J19 terminal of the watchdog. The other cable is to be connected to the J20 terminal of the watchdog and the reset terminal of the mother board. The watchdog pin header has no polarity or direction. Therefore, the cable may be plugged in the reverse direction or the connection of J19 and J20 may be interchanged. Detailed functions of the watchdog will be explained in Chapter "Watchdog functions and connection."



⑫ Mini 20pin Connector for Debug port (J11)

This port is used when manufacturing in the factory.

⑬ 2 pin Dip Switch (SW3)

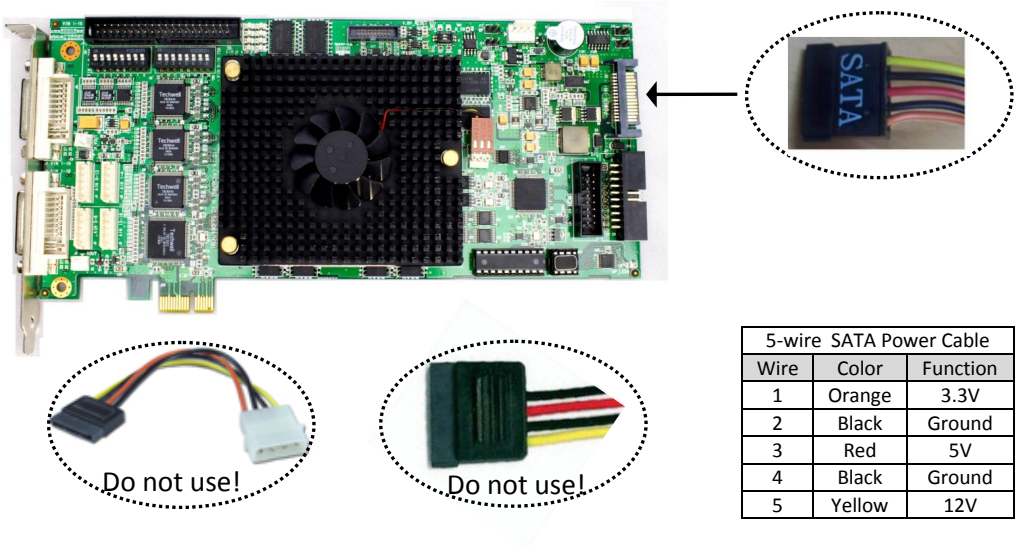
This port is used when manufacturing in the factory. (Default: On/On)

Note

It should be set as ON/ON states; otherwise the HP4000EX cannot be operated normally.

⑭ SATA Power Connector (J15)

HP4000EX requires an additional SATA Power connection, which means you should connect SATA Power cable from a power supply to HP4000EX as following picture. Because PCI Express slot does not supply 5V from a slot. Also HP4000EX requires an additional 3.3V power from the SATA power cable. However, you cannot use a 4-pin Molex to SATA power gender. Because the 4-pin Molex connectors do not provide 3.3 V power, these adapters provide only 5 V and 12 V power and leave the 3.3 V lines unconnected. So you should connect 5-wire SATA power cable to this connector for supplying 3.3V, 5V, and 12V power to HP4000EX.



5-wire SATA Power Cable		
Wire	Color	Function
1	Orange	3.3V
2	Black	Ground
3	Red	5V
4	Black	Ground
5	Yellow	12V

Note

If BIOS does not recognize HP4000EX,
Please check whether the additional 5-wire SATA power cable is connected.

⑮ 20pin Box Connector for connecting the Sensor/Alarm Extension Card (J17)

This connector is used to connect with the sensor/alarm extension card. The 20pin flat cable is used for the connection. The sensor/alarm extension card is not supplied as a basic accessory. Details will be explained in the extension card hardware manual separately supplied.

⑯ Video Output 16pin Box Connector for HDMI port (J16)

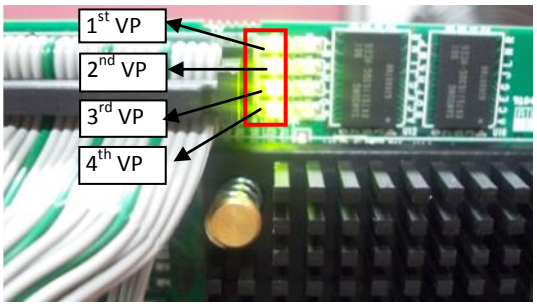
Not used. (This will be supported in the future.)

⑰ uP (Micro-Processor) LED

This LED displays the micro-processor is operating. The uP LED will blink two times when the micro-processor is recognized correctly. And the uP LED will blink when using an extension card via I2C connector.

⑱ VP (Video Processor) LED

You can verify the state of the video processors. If some LED is not turned on, it means that one of the video processors does not work.



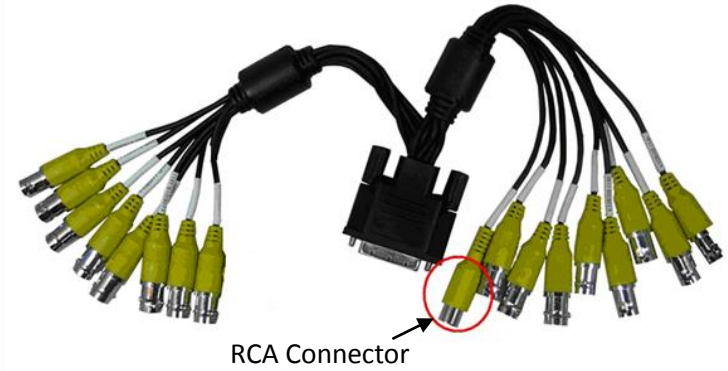
EQUIPMENT FUNCTION

Video

Video Input
Channel: 16ch (Switching View Mode), 15ch (Multi View Mode)
Input: Color Camera (NTSC/PAL), black & white camera
Connection: BNC Port or 40pin flat cable (for connection with video input back panel)
Recommended signal range: 0.5V ~ 2V (p-p)

Video Connections
Connect the camera to the Video input connectors on the back panel using 75 ohm video coaxial cables with a BNC connector.

DVI & 16BNC/1RCA Cable
This cable is used for HP4000EX. It has 16BNC Connectors for Video input and 1RCA Connector for external monitor.



* The appearance or color of a cable is subject to change without any prior notice.

Display on External Monitor

Channel: 1 ch (supporting various dividing modes)
Connection: RCA Port or Video Output Molex 2pin Terminal

Video output RCA Connector for external monitor
This RCA output jack is for displaying on the external monitor, and is connected to the video input terminal of the TV monitor.

Audio

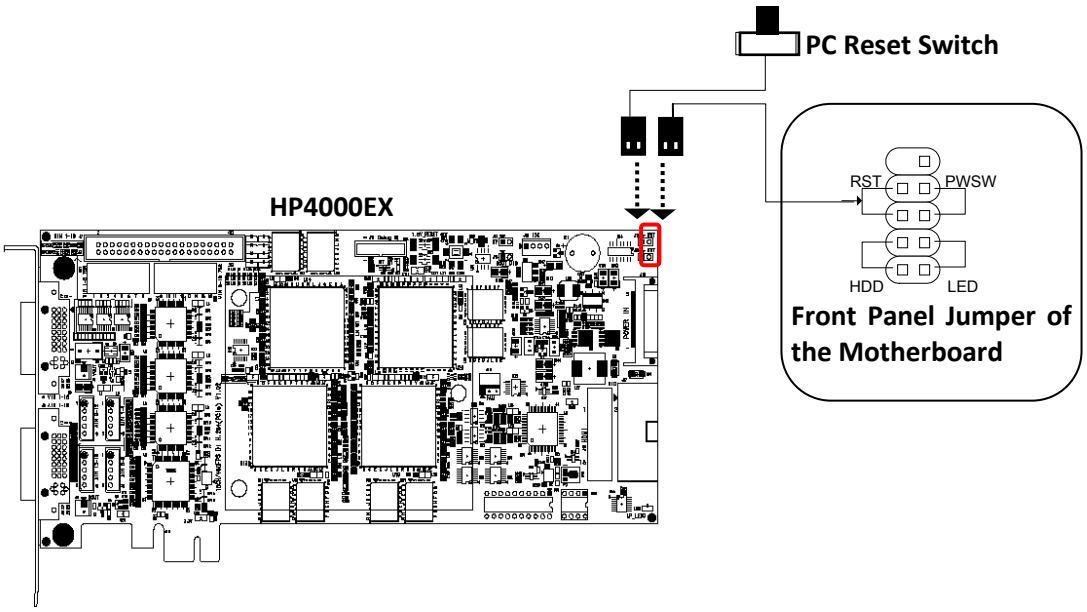
Audio input
Channel: 16ch (Switching View Mode) 15ch (Multi View Mode)
Input: Microphone, line in (mono)
Connection: 5pin Molex connector
Recommended signal range: Max 2.16V (p-p)

DVI & 16RCA Cable
This cable is used for HP4000EX. It has 16RCA Connectors for Audio input.

* The appearance or color of a cable is subject to change without any prior notice.

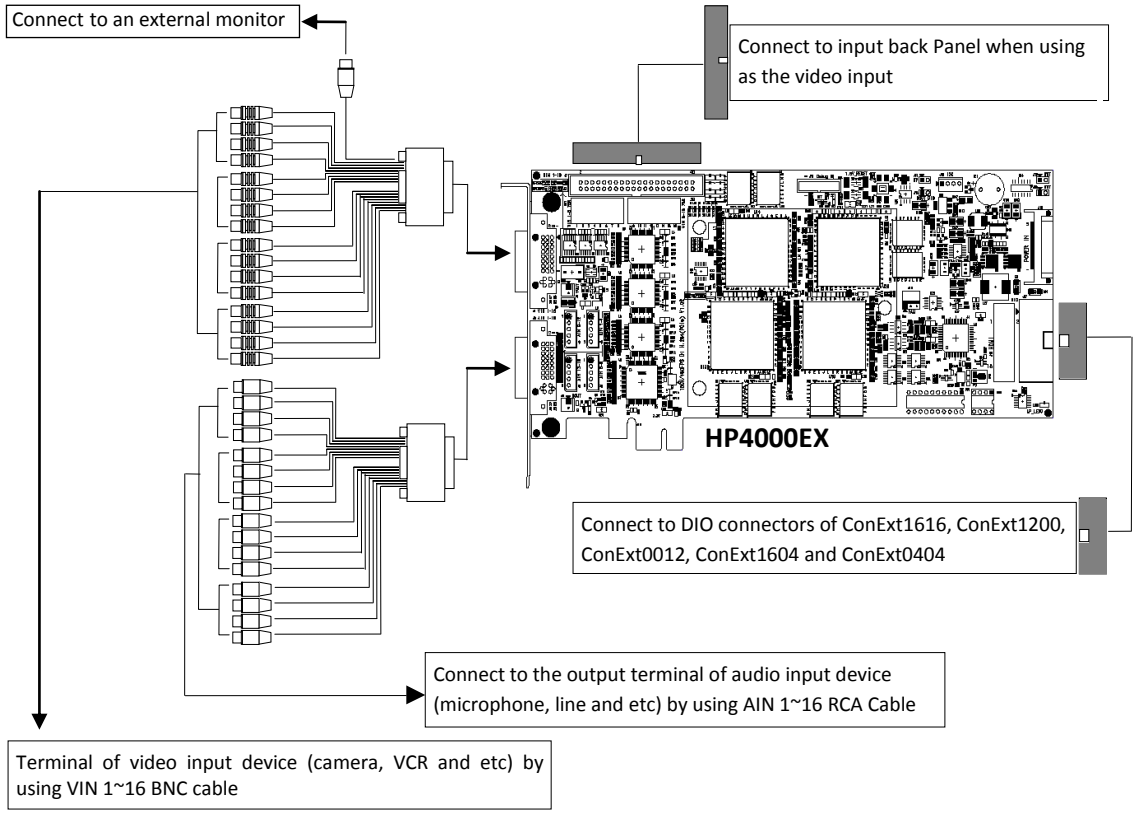
Watchdog Function and Connection

The watchdog is composed of the SYSTEM resetting section and buzzer. The process of resetting the system by the watchdog is similar to pressing the reset button of the system by the system user. So as not to surprise the user by the sudden resetting of the system by the watchdog, it can be set to sound a buzzer to warn of impending resetting.
The watchdog initially remains at function stop state and was designed to reset without sounding a buzzer. To sound the buzzer prior to watchdog resetting, it is required to make the software control the watchdog and set the time of sounding the buzzer. The watchdog function in the software stops when the system is newly booted or reset by the watchdog so it is necessary to set the watchdog function every time.
The watchdog cannot recognize that the system was reset by the user by pressing the reset button. In case the system is reset by way of the reset button on the system while the watchdog is in operation, be wary because the system may be reset again by the watchdog before the system booting is completed.
Two sets of 2pin cable are required to connect the watchdog cable. One is supplied with the capture card and the other is replaced by the existing reset cable enclosed in the case of the system. Firstly, the cable in the reset terminal of the system case shall be connected to the J19 terminal of the watchdog. The watchdog pin header has no polarity or direction. As such, the cable may be plugged in the reverse direction or the connection of J19 and J20 may be interchanged. Below diagram depicts the example of watchdog cable connection.



It shows an example of the reset pin header of the motherboard. The actual location or figure is varied depending on the motherboard. Before connecting, please refer to the motherboard user's manual and make a connection after confirming the correct position.

Connection with Peripheral Equipment


Connect to an external monitor
Connect to input back Panel when using as the video input
HP4000EX
Connect to DIO connectors of ConExt1616, ConExt1200, ConExt0012, ConExt1604 and ConExt0404
Connect to the output terminal of audio input device (microphone, line and etc) by using AIN 1~16 RCA Cable
Terminal of video input device (camera, VCR and etc) by using VIN 1~16 BNC cable

ELECTRICAL CHARACTERISTICS

Power Consumption (MAX)

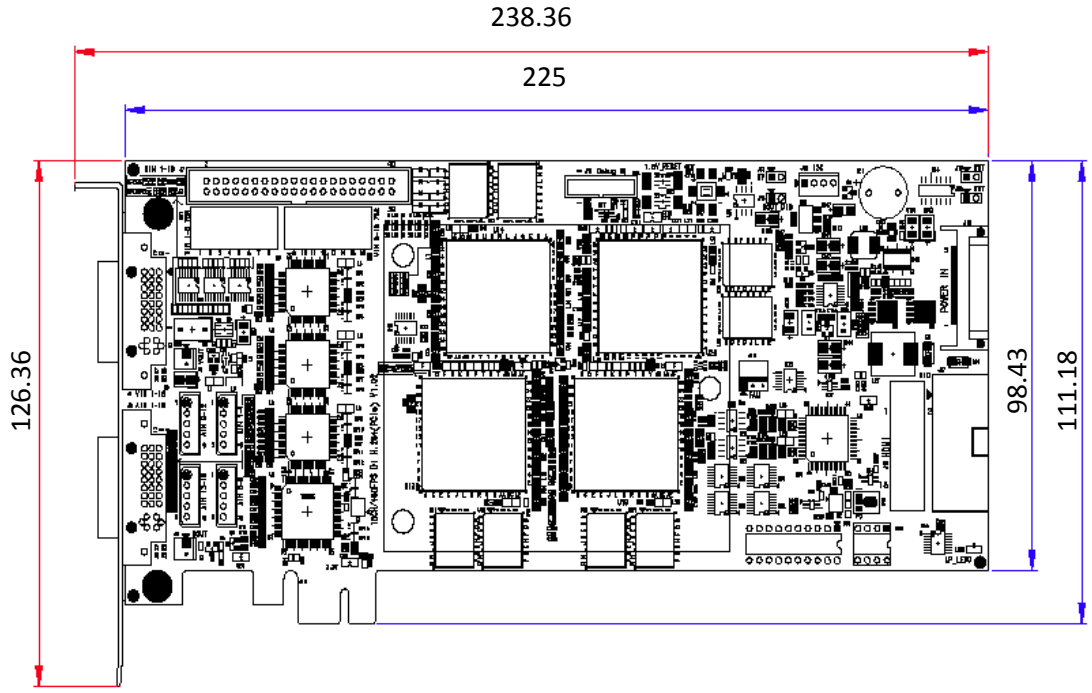
(Max, ± 5%) – HP4000EX card only (not including extension cards)

Voltage [V]	+3.3 V	+5 V	+12 V
Current [mA]	190	140	2200
Power [W]	0.597	0.670	25.54

Operation Environments

Parameter	Limited Range
Video Input range	0.5V ~ 2V (p-p), 75Ω
Audio Input range	Max 2.16V (p-p)
Ambient Operating Temperature	0 ºC ~ 50 ºC (32 ºF ~ 122 ºF)
Ambient Operating Humidity	Up to 90% RH

DIMENSIONS



(Unit: mm)

TROUBLE SHOOTING

REVISION HISTORY

MAN#	DATE(M/D/Y)	Comments
01A.00	09/21/2009	Created.
01A.01	09/28/2009	Corrected the Color of the 3-Pin Cooler Fan Connector.
01A.02	10/28/2009	Operation Temperature is changed from 60℃ to 50℃.
01A.03	11/09/2009	Power consumption is changed SDK V1.2 Official Release • Added Audio Sampling Rate : 16Khz • Added Compression Format : MJPEG • Added 40pin box connector pin out • Multi-card supported • Burnt-in Text supported • Privacy Region supported
01A.04	12/04/2009	Removed supported OS